eOftalmo
http://eoftalmo.org.br

EDITORIAL

Need to establish a national eye health policy for delaying the onset and progression of myopia in elementary school students

Sobre a necessidade de se construir uma política nacional de saúde ocular para retardar o início e a progressão da miopia em escolares do ensino fundamental

Milton Ruiz Alves - Faculdade de Medicina da Universidade de São Paulo, São Paulo, SP.

Worldwide increase in the estimated prevalence of myopia and high-degree myopia between 2000 and 2050 requires immediate implementation of national eye health policies for the management and prevention of ocular complications, which may lead to irreversible blindness in approximately 1 billion individuals with high-degree myopia by 2050[1]. High-degree myopia increases the risk of cataract, glaucoma, retinal detachment, and myopic macular degeneration[2]. Today, in some regions with high myopia prevalence, myopic macular degeneration is the leading cause of irreversible blindness[3]. Immediate implementation of national eye health policies to substantially reduce the onset and progression of myopia may significantly decrease the number of people with myopia and high-degree myopia[1].

Adult-onset high-degree myopia is related to myopia that appears during the early school years; therefore, eye health policies that attenuate prevalence of risk factors associated with the onset and progression of myopia in children will certainly contribute reducing the development of high-degree myopia[4].

Global increase in myopia prevalence cannot be explained by genetic factors alone. In this recent increase in myopia prevalence, contribution of bioenvironmental factors may be greater than that of genetic factors. There is a body of evidence suggesting that increased near-visual activities and educational demands, decreased exposure to sunlight, nutritional changes (including carbohydrate intake), and low indoor light levels are associated with increased prevalence of myopia in school children[5].

Morgan and Rose[6] have demonstrated a direct correlation between bioenvironmental factors (including intensive education and reduced duration of outdoor activities with exposure to sunlight) and high myopia prevalence in all ethnic groups in Singapore, reinforcing the hypothesis that genetic factors do not play such an important role in the current resurgence of myopia.

The so-called "high education levels" influence the prevalence of myopia; however, the cohort effect observed in several studies appears to be multifactorial, and "educational gains" may be only one of the many factors associated with myopia[6]. "Living in an urban area" is another factor associated with the prevalence of myopia, but establishing a direct correlation between this factor and presence of myopia is challenging since "living in an urban environment" is correlated with a higher level of education, longer duration of indoor activities, shorter duration of outdoor activities with exposure to sunlight, and greater educational pressure[5]. However, increase in the duration of outdoor activities with exposure to sunlight may be associated with fewer newly onset myopia cases in schoolchildren, adding to the body of evidence on its protective effect in delaying myopia progression[5]. Rose et al.[7] for the first time proposed that sunlight-stimulated dopamine release by the retina inhibits elongation of the ocular bulb. Recent studies have assessed whether light levels available in school classrooms may influence myopia onset in students[5]. In China, a group of researchers has recently designed and constructed classrooms capable of exposing students to sunlight at 80% of the intensity obtained in outdoor activities[8]. Students and teachers reported significantly higher comfort

Funding: No specific financial support was available for this study.
CEP Approval: Not applicable.
Disclosure of potential conflicts of interest: None of the authors have any potential conflict of interest to disclose.
Received on: Sep 22, 2018
Accepted on: Sep 26, 2018
Corresponding author: Milton Ruiz Alves. Rua Capote Valente 432, conjunto 155, Cerqueira Cesar, São Paulo, SP, CEP 04529-001, Fone (11)30646944. E-mail:miltonruizcbo@gmail.com

How to cite: Alves MR. Sobre a necessidade de se construir uma política nacional de saúde ocular para retardar o início e a progressão da miopia em escolares do ensino fundamental. eOftalmo. 2018: 4(3): 90-1.
http://dx.doi.org/10.17545/eoftalmo/2018.0016

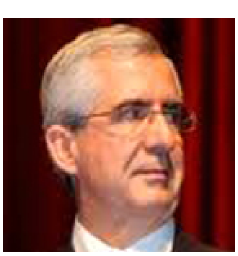
scores in these classrooms compared with those in conventional classrooms. Those authors are planning an interventional study[5]. We emphasize the importance of their research; depending on the results, their model may be replicated worldwide.

Hsu et al.[4] have assessed a cohort of 11,590 second-year metropolitan elementary school students in Taipei (Taiwan) as well as parents of 16,486 students for 3 years (2013-2016). They evidenced high myopia prevalence among students (36.4%) and significant increase in myopia among schoolchildren with myopic parents and who spent more time on near-visual activities performed continuously at shorter distances for over 30 min. They also showed that 6.2% of schoolchildren who spent more than 2 h per day on smartphones, tablets, and computers presented 41% greater risk of myopia than their peers who spent less than 2 h per day using these devices. In Taipei, in addition to morning and afternoon classes, schoolchildren also attend tutorial programs; therefore, only 15.8% of those involved in the study spent more than 1 h on after-school activities[4]. Some studies indicate that to achieve a protective effect against myopia, it is necessary to spend 10-14 h per week on outdoor activities with sunlight exposure[8]. Preventing early onset of myopia in schoolchildren is imperative since the rate of myopia progression is high in young children[9].

Undoubtedly, prompt establishment of a national eye health policy, aiming toward delaying the onset and progression of myopia in elementary schoolchildren in Brazil, is crucial. These programs would allow students to spend 10-14 h per week on outdoor activities with exposure to sunlight. Performing near-visual tasks at very short distances, especially the use of smartphones, tablets, or computers, should be restricted to less than 2 h per day. These policies will need to consider that the prevalence of myopia and high-degree myopia is increasing worldwide and not in Brazil alone and that bioenvironmental factors play the most important role in this increase. Therefore, eye health education campaigns should primarily focus on environmental and behavioral changes among schoolchildren and should consider that even partial success in preventing myopia will represent significant reduction in the number of people with high-degree myopia and irreversible blindness in the future. Thus, it is important to identify bioenvironmental factors that influence the onset and progression of myopia and to publicize useful measures with few side effects that may have positive effects in controlling this condition.

REFERENCES

1. Holden BA, Frickle TR, Wilson DA, Jong M, et al. Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050. Ophthalmology 2016;123(5):1036-1042.
2. Wong TY, Ferreira A. Hughes R, et al. Epidemiology and disease burden of pathologic myopia and myopic choroidal neovascularization: an evidence-based systematic review. Am J Ophthalmol 2014;157(1):9-25.
3. Yamada M, Hiratsuka Y, Roberts CB, et al. Prevalence of visual impairment in the adult Japanese population by cause and severity and future projections. Ophthalmol Epidemiol 2010; 17(1):50-57.
4. Hsu C-C, Huang N, Lin P-Y, et al. Prevalence and risk factors for myopia in second-grade primary school children in Tapei: A population-based study. J Chin Mes Assoc 2016;79(11):525-632.
5. Galvis V, Tello A, Camacho PA, Parra MM, Merayo-Lloves J. Bio-environmental factors associated with myopia: An updated review. Arch Soc Esp Oftalmol 2017;92(7):307-325.
6. Morgan IG, Rose K. Yunnan minority eye study suggests that ethnic differences in myopia are due to different environmental exposures. IOVS 2015;56(8):4430
7. Rose KA, Morgan IG, Ip J, et al. Outdoor activity reduces the prevalence of myopia in children. Ophthalmology 2008;115(8):1279-1285.
8. Zhou Z, Chen T, Wang M et al. Pilot study of a novel classroom designed to prevent myopia by increasing children's exposure to outdoor light. PLoS ONE 2017;12(7), [e018177]. DOI: 10.1371.
9. Donovan L, Sankaridrurg P, Ho A, et al. Myopia progression rates in urban children wearing single-vision spectacles. Optom Vis Sci 2012;89(1):27-32.



Milton Ruiz Alves

https://orcid.org/0000-0001-6759-5259
http://lattes.cnpq.br/6210321951145266